REMARKS

The Office Action dated January 15, 2009 has been received and carefully noted. The above amendments and following remarks are being submitted as a full and complete response thereto.

Claims 1-4, 6-7, 10-18 and 21-28 are pending. By this Amendment, Claims 5, 8-9, and 19-20 are cancelled without prejudice or disclaimer and Claims 1-4, 6-7, 10-18 and 21-28 are amended. Support for the amendments to the claims may be found in the application as originally filed. Applicants respectfully submit that no new subject matter is presented herein. Reconsideration of this application is respectfully requested in view of the following remarks.

Drawing Objection

The Applicants respectfully submit that the Specification, in combination with formal drawing Fig. 1, provides the necessary disclosure for one of ordinary skill in the art to understand the subject matter sought to be patented. Fig. 1 discloses the features discussed in the Specification and recited by the pending claims, and the Applicants submit that further detailed illustration is not essential for a proper understanding of the invention. As such, Applicants respectfully request withdrawal of the objection.

Claim Objection

Claims 14-28 are objected to for containing informalities therein. Applicants have amended the claims in a manner believed to be responsive to the objection. Applicants respectfully request withdrawal of the objection.

Claim Rejections -- 35 U.S.C. § 112

Claims 8-9 and 19-20 are rejected under 35 U.S.C. § 112 first and second paragraphs. Applicants respectfully submit that Claims 8-9 and 19-20 have been cancelled without prejudice or disclaimer, thereby rendering the rejections moot. Accordingly, Applicants respectfully request withdrawal of the rejections.

Claims 22-23 are rejected under 35 U.S.C. § 112 first and second paragraphs. Applicants respectfully traverse the rejections.

The Office Action asserts that Claims 22-23 fail to comply with the enablement requirement and are indefinite because "the specification does not adequately describe a "propulsion chamber" or how it would be used to supply solid material pieces into the reactor." See page 4, paragraph 6, and page 5, paragraph 9 of the Office Action.

Applicants respectfully submit that paragraph [0031] of the published application states that the reactor 10 comprises an input opening 11 through which the material to be treated is supplied. The second sentence of paragraph [0031] states that the solid material loads into the reactor by means of a feeder 12 by means of a propulsion chamber 13. Moreover, paragraph [0037] states that a portion of the output gas from the boiler 26 is withdrawn through duct 36 and used to pressurize the propulsion chamber 13 for the periodic admission of the solid material into the reactor 10. The propulsion chamber, pressurized by the output gases, exerts a pressure on the loading material as the material is periodically fed into the reactor by means of a feeder.

Accordingly, Applicants respectfully submit that the specification describes the claimed invention in sufficient detail that one skilled in the art could reasonably conclude

that the inventor had possession of the claimed invention.

Applicants respectfully request withdrawal of the rejections.

Claim Rejection -- 35 U.S.C. § 102

Claims 1, 5, 10-11, 14-15, 21 and 28 are rejected under 35 U.S.C. § 102(b) as being unpatentable over U.S. Patent No. 4,925,389 to DeCicco et al. (DeCicco). Applicants respectfully traverse the rejection.

Claims 1 and 14 similarly recite a method and an apparatus, respectively, for the treatment of materials that includes, among other steps and features, supplying a material to be treated and a combustion supporter comprising oxygen and recycled gases into an oxidation chamber or combustion reactor that is operated at a pressure from greater than atmospheric pressure to 600 kPa and wherein water is injected into the recycled gases to raise the concentration of water in the recycled gases to higher than 30% by volume.

DeCicco discloses a system which includes methods and apparatus for treating waste materials containing organic contaminants (col. 1, lines 10-13). DeCicco teaches away from the present invention in that DiCicco expressly operates at a pressure lower than atmospheric pressure. The apparatus disclosed in DeCicco is kept under a slightly negative pressure relative to the atmosphere. Thus, in the event that any seal develops a leak, the contaminant will not be discharged into the atmosphere (see the sentence bridging cols. 2-3). The constant negative pressure in the entire system is maintained, see Fig. 1, by the blower 56 (col. 3, last sentence).

In the apparatus of DeCicco, the material to be treated is supplied to the countercurrent direct fired rotary kiln 13 (col. 2, lines 57-58). The ash drops out of the

discharge end 25 and is fed to a conveyor 27 to a rotary cooler 29 and then dropped into a discharge conveyor 33 (col. 3, lines 15-17). Burner 21 in kiln 13 operates at substantially stoichiometric conditions, wherein enough air is provided to effect substantially complete combustion of the fuel (col. 3, lines 9-11). The off gas from the kiln 13 is conducted through a duct 35 to a secondary combustion unit 37, which includes a burner section 39, in which the combustion gas is subjected to high enough temperatures (please note, higher than in the kiln, see the temperature range reported at col. 7, lines 23-24 and that for the kiln reported at col. 4, lines 25-26) to effect the destruction of unwanted organics (col. 3, lines 39-42). To do this, a fueled burner and an excess of air is employed (col. 3, lines 42-43, see also col. 10, lines 45-46).

Contaminated waste liquids can be introduced into unit 37 (see Fig. 6A) in both the primary and secondary combustion zones 111 and 113 of the unit (col. 8, lines 19-21). In zone 13 a downward and rotative movement of gases is produced (col. 8, lines 43-44). All of the particles, gases and vapors in the zones 111 and 113 will be subjected to substantially uniform temperature (col. 8, lines 61-64). The combustion products then pass (see Fig. 1) through the holding section 41 (col. 3, lines 51-52), directed through a cooling section 43 in the secondary combustion unit 37, in which water sprays 45 cool the heated gases (col. 9, lines 23-25). The water sprays cause suspended particulate matter to fall into a sump 47 (col. 3, lines 55-60). The solid settles so that the it can be withdrawn through a discharge opening 179 and dewatered by a dewatering screw 49 (Fig. 1, col. 9 lines 38-41).

DeCicco does not disclose or suggest recycling of the combustion gases wherein water is injected into the recycled gases to raise the concentration of water in the

recycled gases to higher than 30% by volume, as similarly recited by Claims 1 and 14.

To qualify as prior art under 35 U.S.C. §102, each and every feature recited in a rejected claim must be disclosed by the applied art. For at least the reasons provided above, Applicants submit that DeCicco does not disclose, teach or suggest each and every feature, and actually teaches away from certain features, recited by Claims 1 and 14. Accordingly, DeCicco does not anticipate, nor render obvious, the subject matter recited by Claims 1 and 14. Therefore, Applicants respectfully submit Claims 1 and 14 should be deemed allowable over DeCicco.

Claims 5 and 10-11 depend from Claim 1 and Claims 15, 21, and 28 depend from Claim 14. It is respectfully submitted that these dependent claims are allowable for at least the same reasons that Claims 1 and 14, respectively, are allowable as well as for the additional subject matter recited therein.

Accordingly, Applicants respectfully request withdrawal of the rejection.

Claim Rejections -- 35 U.S.C. § 103

Claims 2-4, 6-7, 12-13, 16-17 and 27 are rejected under 35 U.S.C. §103(a) as being unpatentable over DeCicco in view of U.S. Patent No. 6,848,375 to Kasin; Claim 18 is rejected under 35 U.S.C. §103(a) as being unpatentable over DeCicco and Kasin, and further in view of U.S. Patent No. 6,883,443 to Rettig; Claims 8-9 and 19-20 are rejected under 35 U.S.C. §103(a) as being unpatentable over DeCicco in view of U.S. Patent No. 5,199,356 to Hoffert; and Claims 24-26 are rejected under 35 U.S.C. §103(a) as being unpatentable over DeCicco in view of U.S. Patent No. 5,320,050 to Ishida et al. Applicants respectfully traverse the rejections.

DeCicco is discussed above with respect to independent Claims 1 and 14. Applicants respectfully submit that Kasin, Rettig, Hoffert and Ishida, alone or by any combination, fail to cure, and suffer from, the deficiencies of DeCicco.

Kasin relates to a method and device for converting energy by combustion of solid fuel, especially incineration of bio-organic fuels and municipal solid waste, to produce heat energy arid which operates with very low levels of NO_x, CO and fly ash (col. 1, lines 4-8). The main features of the energy converter of Kasin are the following:

1) oxygen flow in the combustion chamber is controlled by regulating the flow of fresh air which is fed into the chamber (col. 3, lines 50-51);

2) temperature in the combustion chamber is controlled by admixing a regulated amount of the recycled flue gas with the flow of fresh air (col. 3, lines 55-57); and

3) the recycled flue gas and fresh combustion gases are filtered in unburned sold waste, in the first combustion chamber, by sending the unburned solid waste and the gases in counter-flow before entering the gases into the second combustion chamber (col. 3, lines 59-63). By doing so, as it is stated at col. 4, lines 62-63, a large portion of the fly ash, and other solid particles entrained in the gas leaving the combustion chamber, are removed.

As shown in Fig. 2 of Kasin, the plant comprises a primary combustion chamber 1, a secondary combustion chamber 30 with a cyclone, not shown in Fig. 2, a boiler 40, a gas filter 43, a pipe system for recycling and transportation of flue gas, and a pipe system for supplying fresh air (col. 5, lines 24-29). Municipal waste in the form of bases 80 (see Fig. 1) is inserted in the air tight fireproof sluice 2, formed by dividing off a

section 5 of the upper part of the primary combustion chamber 1 by inserting a removable hatch 7 (col. 5, lines 33-40). The recycled flue gas entering the inlet 3 is taken from the exhaust pipe 50 and transported by a pipe 51. The pipe 51 is equipped with a valve 52. The outlet 4 is connected to a by-pass pipe 54 (col. 5, lines 46-49).

At first, the bottom hatch 7 and valves 52 and 53 are closed. Bottom hatch 6 (see Fig. 1) is opened and a bale 80 loaded (col. 5, lines 5-55). Then, top hatch 6 is closed and valves 52 and 53 are opened. Then, recycled flue gas flow into the empty space in the sluice chamber and ventilate out fresh air. At the end, bottom hatch 7 is opened and the hale slide downwards into the combustion chamber 1 (col. 5, lines 59-65).

The bottom ash deposited in the primary combustion chamber is removed by rotation of ash sluice cylinder 10 that is provided with grooves 11 that fill with the bottom ash (col. 6, lines 37-41). The cyclone is attached at the outlet of the second combustion chamber and helps reduce the content of fly ash and other entrained solid particles in the gas flow (col. 11, lines 45-46). The gas filter 43 brings any additional reduction of fly ash and other pollutants of the flue gas before they are discharged as exhaust gas (col. 12, lines 26-28).

In example 1, Kasin teaches that the internal pressure in the primary combustion chamber is kept approximately 80 Pa below the surrounding atmospheric pressure and in the secondary combustion chamber approximately 30 Pa below the pressure in the primary combustion chamber. See col. 12, lines 6 4-67 and col. 13 lines 4-6.

The Office Action asserts that it would be obvious to one skilled in the art to combine the apparatus of DeCicco with the flue gas recirculation and control system of

Kasin because such combination would have produced the added benefit of a furnace with an automated pollution control system to reduce nitrous oxide emission (see paragraph 16 bridging pages 8-9 of the Office Action).

The Applicants respectfully submit that the combination teaches to operate the combustor under different conditions than in the present invention. As a matter of fact, DeCicco teaches to operate at a pressure lower than atmospheric pressure and Kasin is, for the most part, silent on the working pressure. But in example 1, Kasin teaches to operate at a pressure lower than the atmospheric pressure. Therefore, the combination of DeCicco and Kasin suggests operating the combustor at a pressure lower than atmospheric pressure, and certainly does not teach or suggest operating at the pressures recited in Claims 1 and 14.

Moreover, in DeCicco, flue gas particles are removed, as described above, by means of the water sprays in the lower part of the secondary combustion unit 37. In Kasin, flue gas particles are removed by sending the unburned solid waste and the gases in counter-flow in the first combustion chamber 1 and, further, by means of the cyclone positioned after the second combustion chamber 30, and at last through the filter 43, wherein also the other pollutants are reduced. As such, DeCicco and Kasin, alone or in combination, do not teach or suggest removing both flue gas particles (with melting ashes) and total organic compounds in one pressurized isothermal reactor wherein combustion gases admixed with H_2O are recycled, as in the process of the present invention.

Rettig discloses improving the efficiency of coal based power generation plants and, in particular, Rettig is concerned with the reduction of slogging and fouling at the

exit of the coal boiler fire box (col. 1, lines 39-42). Fig. 2 of Rettig reports a furnace boiler system 200, comprising the furnace 250 that includes the firebox 210 and the upper furnace 220. In the upper furnace 220 the superheater 230 and the preheater 240, respectively, superheats and reheats the steam generated by heating water in the firebox (col. 5, lines 46-55). Flue gas rises up from the firebox 210 into the upper furnace 220 around the superheater 230 and the reheater 240 and out of the furnace to the air preheater 260. The flue gas is then sent through the electrostatic precipitator (ESP) 270. (col. 5, lines 50-59)

The flue gas at the output of the ESP 270 is clean and practically free of fly ash and has cooled down to its lowest temperature in the system (col. 5, lines 60-64). According to a preferred embodiment, a portion of the clean and cooler flue gas downstream of the ESP 270 is recirculated through the flue gas duct 290 to the ports 295 located in the upper section of the firebox 210. (co1. 5, line 65 bridging, col. 6, line 4). The cool flue gas is injected into the firebox and mixes with the higher temperature main flue gas coming directly from the coal combustion, thus reducing the temperature of the main flue gas to below the specific fly ash temperature. The process prevents slagging and fouling of the surfaces of the furnace (col. 6, lines 7-11).

The Office Action admits that DeCicco and Kasin do not disclose a means for mixing a portion of the recycled gases with the gases output from the reactor prior to their entry into the cooling means (see page 9, paragraph 17, of the Office Action). The Office Action asserts that "it would have been obvious to one skilled in the art at the time of the invention to combine the apparatus of '389 [DeCicco] in view of '375 [Kasin] with the cooled flue gas system of '443 [Rettig] because such a combination would have

produced the added benefit of a cooler and more diluted flue gas which can be more efficiently cleaned." See page 9, paragraph 17, of the Office Action.

Applicants respectfully submit that Rettig also does not teach or suggest supplying a material to be treated and a combustion supporter comprising oxygen and recycled gases into an oxidation chamber or combustion reactor that is operated at a pressure from greater than atmospheric pressure to 600 kPa and wherein water is injected into the recycled gases to raise the concentration of water in the recycled gases to higher than 30% by volume, as recited by Claims 1 and 14, respectively.

Furthermore, Rettig teaches that the cooler flue gas is recirculated through the gas duct 290 to the ports 295 located in the upper section of the firebox 210. Therefore, Rettig teaches that the recirculated cooler flue gas is injected into the firebox. With respect to Claim 18, the present invention recites the mixing of the recirculated gas with the gas output from the reactor. As such, mixing occurs outside the reactor in the present invention, rather than inside the reactor, as taught by Rettig. Moreover, the combustion gases at the output from the reactor in the present invention already contain significantly reduced amounts of flue gas particles. As such, one of ordinary skill in the art would not be motivated to look to Rettig for "a cooler and more diluted flue gas which can be efficiently cleaned," as indicated by the Office Action on page 9, paragraph 17, as the reason for combining the references. The output in the present invention does not need to be cleaned as taught by Rettig.

With respect to the rejection of Claims 8-9 and 19-20, Applicants respectfully note that the claims have been cancelled without prejudice or disclaimer. As such, the rejection is rendered moot and the Applicants request withdrawal.

Hoffert discloses a pressurized incineration method for disposing solid waste and producing at the same time electrical and thermal energy (col. 1, lines 6-8). The apparatus of Hoffert is shown in Fig. 1. Atmospheric air enters the compressor 11 through intake line 13 and, after being compressed, is discharged through a compressor outlet duct 15. The compressed air moves through lines 17 and enters a combustion chamber 19 through a combustion chamber intake line 21 (col. 3, lines 47-52). The effluent combustion gases exit the combustion chamber 19 through a combustion chamber exhaust duct 25, and are quenched to an inlet temperature suitable for the turbo charger and power turbine, by injecting air, steam, water with a quench system 29. A gas cleaning equipment 47 is provided, that has an exhaust duct 49 which splits into the first and second turbine intake ducts 27, 29 (col. 4, lines 1-16). Through the first and second turbine intake ducts the hot compressed gases move into the first and second turbines 31, 33 (col. 4, lines 21-22).

Expansion of the first portion of hot compressed gas through the first turbine 31 provides mechanical energy via shaft 35 for driving the compressor 11. Expansion of the second portion of hot compressed gas through the second turbine 33 provides mechanical energy for driving an electrical generator (col. 4, lines 32-37). The expanded gases exit the first and second turbine exhaust ducts 43 and 45, respectively (co. 4, 1ines 44-47).

Applicants respectfully point out that DeCicco teaches the opposite of Hoffert. In fact, the apparatus of DeCicco is operated contrarily to that of Hoffert, at a pressure lower than atmospheric pressure, since DeCicco wants to avoid contaminants from being discharged into the atmosphere in the event a seal develops a leak (see the

sentence bridging cols. 2-3 of DeCicco). As such, one of ordinary skill in the art would not consider the reference of Hoffert in combination with DeCicco, as the combination would make the apparatus of DeCicco unfit for its intended purpose.

With respect to the rejection of Claims 24-26, Ishida discloses an ash melting furnace wherein incineration ashes discharged from a municipal or industrial waste incinerator are melted by using a burner, then collected and solidified, so as to reduce the volume of incineration ashes and make them harmless (col. 1, lines 6-10). In Fig. 1 of Ishida, reference numeral 1 denotes an ash melting furnace. The bottom wall 3 of the furnace body 2 thereof is inclined downwardly from the ash charging side (one end side) to the discharging side (the other end side). The end wall 8 on the discharging side is formed with a discharging port 22 for molten ashes. The portion of the furnace body 2 adjacent to the charging port 21 defines an ash pretreating chamber 11, the portion thereof adjacent to the discharging port 22 defines a melting chamber 12. (col. 1, line 66 bridging, col. 2 line 13)

Fig. 14 shows the parts corresponding to numerals 206 and 213, cited by the Office Action in paragraph 19 on page 10. Fig. 14 relates, in particular, to the cooling chamber for molten slags (col. 9, lines 3-4), since the basic arrangement of the apparatus shown in Fig. 14 is the same as that of Fig. 1 (col. 9, 1ines 4-7). In the equipment of Fig. 14 the preheated incineration ashes A are melted by the heating burner 210 to become molten slags C. The molten slags are dropped from the discharging port 205 into the cooling tank 207 in the slag cooling chamber 206 (col. 9, lines 51-54). The molten slag C is heated by the auxiliary burner 213 and is prevented from having its temperature lowered enough for the slag to be bonded to the

discharging port 205.

DeCicco does not teach or suggest that the ashes collected at the bottom of the kiln shell 59 (Fig. 2) are molten. Ishida discloses that the ashes can be discharged from the discharge end 25 on a conveyor 27. There is no mention in DeCicco of the ashes being melted. DeCicco also does not teach or suggest that the kiln 13 is an ash melting furnace. Therefore, one of ordinary skill in the art would not consider the combination of Ishida and DeCicco as indicated by the Office Action. Moreover, Ishida does not teach or suggest supplying a material to be treated and a combustion supporter comprising oxygen and recycled gases into an oxidation chamber or combustion reactor that is operated at a pressure from greater than atmospheric pressure to 600 kPa and wherein water is injected into the recycled gases to raise the concentration of water in the recycled gases to higher than 30% by volume, as recited by Claims 1 and 14.

For at least the reason(s) provided above, Applicants respectfully submit that DeCicco, Kasin, Reggit, Hoffert, and Ishida, alone or by any combination, do not disclose, teach or suggest, and actually teach away from certain features, as recited by Claims 1 and 14. As such, Applicants respectfully submit that one of ordinary skill in the art would not find it obvious to modify DeCicco according to the teachings of Kasin, Reggit, Hoffert, and Ishida, alone or in combination, because to do so would not arrive at the invention recited by Claims 1 and 14, respectively. Accordingly, Applicants submit that Claims 1 and 14 should be deemed allowable over DeCicco, Kasin, Reggit, Hoffert, and Ishida.

Claims 2-4, 6-7 and 12-13 depend from Claim 1 and Claims 16-18 and 24-27 depend from Claim 14. It is respectfully submitted that these dependent claims are allowable for at least the same reasons that Claims 1 and 14, respectively, are allowable as well as for the additional subject matter recited therein.

Accordingly, Applicants respectfully request withdrawal of the rejections.

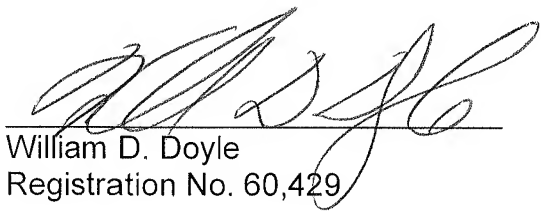
Conclusion

In view of the foregoing, Applicants respectfully request reconsideration of the application, withdrawal of the outstanding objections and rejections, allowance of Claims 1-4, 6-7, 10-18, and 21-28 and the prompt issuance of a Notice of Allowability.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing attorney docket number 108907-00043**.

Respectfully submitted,



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